Station, Charlotte County, he heard in the distance a shrieking, whistling sound; this continued to increase in intensity, and turning to seek a cause he noticed a whirlwind advancing from the hills, its course indicated by the swaying shrubs and a noise somewhat like that produced by a express train, but not so loud. It struck the pool about three feet from the shore, and raised the water in a foaming mass of froth and spume to a height of 5 feet, and crossing threw the water upon the farther shore. Its path across the pool was about 15 feet wide. Mr. Barber was standing about one hundred feet from the path of the whirlwind. The sky was clear all day. In the morning there were a few light clouds, but after 2 p. m. the sky was cloudless.

The wind was northeast till noon, then shifted to southwest and south. It was light all day. The barometer was steady; at 8 a. m., 30.081; at 2 p. m., 30.129; at 8 p. m., 30.185. In St. John the highest temperature was 65° F., but at Clarendon the temperature was probably about 5° higher, the preceding days had been cold, and the change in temperature was considerable and rapid.

A very similar phenomenon was observed on Wednesday, June 14, at Grassy Lake, Kings County.

Dr. Colter, post office inspector, and Mr. Richard Magee, of the railway mail service, were fishing from a moored boat on the lake. It was a fine, clear day, and a good breeze was blowing when about 2 o'clock in the afternoon they heard a roaring in the woods, and with a rushing noise a few hundred feet from them the water of the lake commingled with reeds, lillies, and mud was torn up and hurled into the air, forming a waterspout apparently about 30 feet in diameter.

It lasted about two minutes, and for about that time the air seemed somewhat darkened. The violence of the wind drew their boat from its moorings in among the reeds, and it was fortunate that they were far enough from the path of the whirlwind to escape any more serious results.

LIGHTNING FROM A CLOUDLESS SKY.

By CHARLES E. ASHCRAFT, JR., Weather Bureau, Roseau, Dominica, W. I., dated November 14, 1900.

The phenomenon of lightning from a cloudless sky seems to be regarded in the States as one of very rare occurrence, as it very likely is. I can not remember of ever observing it while in the States, but down here in the West Indies it is of very frequent occurrence, so frequent in fact that it is not regarded as remarkable by the people. When first I saw this phenomenon after arriving in the tropics it caused me considerable wonder, and I was also in doubt as to whether it was real lightning or not. So I made inquiries among the residents and found to my surprise that it occasioned no wonder to them, and they evidently failed to understand why it should to me. Subsequently I have observed it numerous times, till finally the novelty has worn off, and I, like the residents, accept it now as only an ordinary occurrence. However, I believe this letter is justified, inasmuch as the phenomenon is rare in the States and any information relating thereto may be welcome.

The appearance of the flash is that of sheet lightning, generally single flashes being seen at intervals of from two to five minutes, and again only two or three occasional flashes will be seen during an evening. They do not seem to be confined to any particular quarter of the sky for local reasons, as I have observed them in all quarters. I do not think flashes are due to falling meteors, but they may be the reflected flashes of distant thunderstorms, although a clear sky certainly does not offer so good a reflecting surface as a clouded one. However, I am inclined to believe that the theory of the exchange of electricities between vertical currents of air is a very plausible explanation for the following reasons: In the first place the phenomenon has *always* been observed in the evening, usually between 7 and 9 p. m., never before 7, I believe, but several times after 9 o'clock. As this latitude is free from the disturbing effects of ever-passing areas of high and low pressure, the diurnal phases of the weather are therefore very constant and much alike from day to day. So that ordinarily between 7 and 9 p. m. the temperature falls, cool breezes spring up, a rapid clearing condition sets in, the clouds disappearing sometimes like magic, and by 9 p. m. the sky is usually clear. Now, it is always at this time when the colder currents of air are descending, causing the cool breezes and clearing condition and setting up a vertical circulation with steep gradients, that the lightning is seen. Sometimes the sky is not absolutely clear, a few clouds nearly always hanging over the mountains to the east of station, but the lightning will be seen far out to sea, perhaps, to the westward, where not the least vestige of cloud is visible. Then it is about this time in the evening that the maximum electrification of the air occurs, and in view of the fact that the lightning always occurs at the one time, is it not probable that the exchange of electricities between the descending and ascending currents having different temperatures and humidities, and therefore different electrical potentials, is the cause thereof.

I may add that these lightning flashes have been observed more frequently during the hurricane season, but just what weather conditions prevailed on the dates of occurrence I am unable to say, as I failed to make note of the dates. Furthermore, the phenomenon can not be peculiar to the region of Dominica alone, as I have talked to a number of persons who have lived long in tropical parts, and they are all agreed that lightning from a clear sky is no uncommon thing. By way of suggestion it might be worth while to question the observers of the West Indian and other tropical stations on the matter, and in this way considerable information might be adduced.

MEXICAN CLIMATOLOGICAL DATA.

Through the kind cooperation of Señor Manuel E. Pastrana Director of the Central Meteorologic-Magnetic Observatory the monthly summaries of Mexican data are now communicated in manuscript, in advance of their publication in the Boletin Mensual. An abstract, translated into English measures, is here given, in continuation of the similar tables published in the MONTHLY WEATHER REVIEW since 1896. The barometric means have not been reduced to standard gravity, but this correction will be given at some future date when the pressures are published on our Chart IV.

Mexican data for November, 1900.

Stations.	Altitude.	Mean barometer.	Temperature.			Relative humidity.	Precipitation.	Prevailing direction.	
			Max.	Min.	Mean.			Wind.	Cloud.
	Feet.	*Inch.*	° *F.*	° *F.*	° *F.*	%	*Inch.*		
Leon (Guanajuato)...	5,934	24.35	79.3	37.6	60.8	59	1.01	n.	e.
Mazatlan	25	29.93	85.8	68.4	77.2	74	.....	nw.	nw.
Mexico (Obs. Cent.)..	7,472	23.10	74.3	40.1	57.0	57	0.32	n.	ne.
Morelia (Seminario)..	6,401	24.02	74.8	42.8	57.7	67	1.28	w.	w.
Puebla (Col Cat.)....	7,112	23.43	76.8	39.0	60.8	65	0.59	e.	w.
Puebla (Col. d'E.)....	7,116	23.34	78.4	45.3	63.1	64	0.71	ene.	sw.
Saltillo (Col. S. Juan).	5,399	24.84	78.8	39.2	56.8	81	1.65	ne.	n.
San Luis Potosi.....	6,902	24.15	78.8	40.5	58.8	67	1.44	e.	e.
Tampico.....	38	30.08	86.0	52.2	71.6	72	0.38	se.	.....

OBSERVATIONS AT HONOLULU.

Through the kind cooperation of Mr. Curtis J. Lyons, Meteorologist to the Government Survey, the monthly report of meteorological conditions at Honolulu is now made partly in

accordance with the new form, No. 1040, and the arrangement of the columns, therefore, differs from those previously published.

Meteorological Observations at Honolulu, November, 1900.

The station is at 21° 18′ N., 157° 50′ W.
Hawaiian standard time is 10h 30m slow of Greenwich time. Honolulu local mean time is 10h 31m slow of Greenwich.
Pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.
The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.
The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.
The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet, and the barometer 50 feet above sea level.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m., Greenwich time, or 2.29 a. m., Honolulu time.									Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.			Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.	Average cloudiness.	Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	29.97	75	68	80	70	66.3	70	ne.	6-4	5	30.02	29.94	0.02
2	30.04	74	67	80	74	65.7	68	ne.	3	3	30.08	29.95	0.19
3	30.05	70	66.5	79	69	62.7	66	ne.	6-4	5-3	30.11	30.03	0.60
4	30.02	71	64	76	67	62.5	72	ne.	4-5	8-5	30.11	30.02	0.13
5	30.01	71	64	76	66	60.7	64	ne.	3	5	30.07	29.97	0.05
6	29.98	72	64.5	78	68	62.3	68	ne-nne.	2-0	2-6	30.04	29.95	0.07
7	29.94	73	66	78	69	63.0	70	nne.	3	3	30.04	29.93	0.03
8	29.89	65	63	78	68	64.3	72	nne.	1-3-0	10	29.95	29.88	0.00
9	29.89	75	68	79	65	65.3	78	sw.	1-0	6	29.94	29.84	0.00
10	29.96	72	62.5	77	72	61.5	65	n-nne.	4-6	5-2	29.98	29.91	0.00
11	30.01	73	63	76	72	55.7	53	nne.	6	2-5	30.06	29.95	0.00
12	30.00	72	63	74	72	59.3	63	n-ne.	3-4	8	30.08	29.89	0.10
13	29.90	69	63.5	77	72	58.7	60	ne.	3-0	3	30.02	29.89	0.02
14	29.79	72	66	77	67	61.0	67	nne.	2-0	8-3	29.91	29.79	0.00
15	29.60	76	74	77	69	67.0	83	nne-s.	2-0-3	10	29.79	29.61	2.50
16	29.69	73	72.5	79	72	73.3	89	sw.	3-5	10	29.73	29.57	1.50
17	29 84	73	70	78	71	70.0	91	s-sw.	0-1	10-7	29.86	29.71	0.03
18	29.86	75	73	81	69	74.0	86	s-sw.	3-0	9-7	29.89	29.80	0.02
19	29.98	76	74.5	81	75	74.3	88	ssw.	2	8	29.99	29.86	0.01
20	29.98	68	67.5	83	76	72.5	86	ssw.	2-0	7-0	30.02	29.94	0.00
21	29.95	70	68.7	84	68	69.7	88	sw.	1-0	1-6-0	30.02	29.95	0.00
22	29.94	68	67	84	68	69.5	85	ssw.	1-0	4	29.98	29.89	0.00
23	29.96	69	67.5	83	67	69.7	85	sw-w.	1-0	0-5	29.98	29.90	0.02
24	29.94	74	69	80	67	67.3	79	nw-nne.	0-4	6	30.00	29.90	0.03
25	29.94	74	68.5	78	73	66.7	73	ene.	4-2	9-10	30.02	29.93	0.30
26	29.84	72	71.3	77	71	67.7	81	ne.	2	10	29.99	29.89	5.45
27	29.89	70	69.3	75	71	71.7	96	ne-w.	1-0	10	29.94	29.86	0.23
28	29.90	69	68.3	80	70	70.7	89	s.	1-0	7-10	29.93	29.85	0.00
29	29.93	75	69.5	80	69	69.3	84	sw-ne.	1-2	10-7	29.96	29.86	0.00
30	29.94	72	67	80	72	67.0	75	ne.	2-0	7-3	29.99	29.89	0.00
Sums..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.30
Means.	29.921	71.9	67.6	78.8	69.9	66.3	76.6	.....	2.2	5.7	29.983	29.882	.....
Departure..	—.028	.....	.....	.....	...	+0.6	0.0	.....	.....	+1.1	.....	.....	+5.78

Mean temperature for November, 1900 (6+2+9) ÷ 3 = 74.1; normal is 73.8. Mean pressure for November, 1900 (9+3) ÷ 2 = 29.929; normal is 29.957.
*This pressure is as recorded at 1 p. m., Greenwich time. †These temperatures are observed at 6 a. m., local, or 4.31 p. m., Greenwich time. ‡These values are the means of (6+9+2+9) ÷ 4. § Beaufort scale.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined list of titles has been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau:

Annalen der Physik. Leipzig. Vierte folge. Band 3.
Fischer, K. T. Ein neues Barometer (Luftdruckaräometer). P. 428.
Wedell-Wedellsborg, P. S. Notiz über die Ursachen der secularen Variationen des Erdmagnetismus. P. 540.
Wien, W. Zur Theorie der Strahlung schwarzer Körper, Kritisches. P. 530.

La Nature. Paris. 28me année.
Durand-Greville, E. Le nuage en sac ou mammatus. P. 401.
Geographische Zeitschrift. Leipzig. 6 Jahrg.
Koeppen, W. Versuch einer Klassifikation der Klimate, vorzugsweise nach ihren Beziehungen zur Pflanzenwelt. P. 593.
Bulletin of the American Geographical Society. New York. Vol. 32.
Turner, E. T. The Climate of New York. P. 101.
Nature. London. Vol. 63.
Lockyer, (Sir) Norman, and Lockyer, W. J. S. Solar Changes of Temperature and Variations in Rainfall in the region surrounding the Indian Ocean. P. 107.
Frankenfield, H. C. Kite Work of the United States Weather Bureau. P. 109.
Liveing, G. D. and Dewar, J. Spectroscopic Investigations of Gases in Atmospheric Air. P. 189.
Scientific American. New York. Vol. 83.
—— Shooting at the Clouds [for dispelling hail]. P. 371.
Scientific American Supplement. New York. Vol. 50.
Cordeiro, F. P. Tropical Hurricanes. P. 20858.
Ciel et Terre. Bruxelles. 21me année.
Hepites, S. Pluie extraordinaire en Roumanie. P. 442.
Sieberg, A. Funkenblitz. P. 261.
Quarterly Journal of the Royal Meteorological Society. London. Vol. 26.
Symonds, G. J. Wiltshire Whirlwind of October, 1899. P. 261.
Marriott, William. Rainfall in the West and East of England in Relation to Altitude above Sea Level. P. 273.
Baxendell, Joseph. Description of Halliwell's Self-recording Rain Gage. P. 281.
Ackermann, Eugene. Climate and Diseases of Northern Brazil. P. 288.
Das Wetter Berlin 17 Jahrg.
Polis, P. Das meteorologische Observatorium Aachen. P. 241.
Kassner, C. Meteorologische Beobachtungen auf einer Reise nach Bulgarien. P. 245.
Stade, H. Winterbilder vom Brocken. P. 258.
Archives des Sciences Physiques et Naturelles. Genève. 4me Période. Tome 10.
Gautier, R. Résumé météorologique de l'année 1899 pour Genève et le Grand Saint Bernard (suite). P. 467.
Zeitschrift für Gewässerkunde. Leipzig. Band 3.
Ototsky, P. Der Einfluss der Walder auf das Grundwässer. P. 153.

CLIMATE OF SPOKANE, WASH.

By CHARLES STEWART, Observer, Weather Bureau.

Spokane is situated in eastern Washington, in latitude 47° 40′ north, longitude 117° 25′ west, between the Rocky and Cascade mountains, at an elevation of about 1,900 feet above the sea level.

The United States Weather Bureau office in Spokane was established February 1, 1881, giving up to date, April, 1900, meteorological records for over eighteen years. In the preparation of the accompanying tables only *whole* years have been considered, leaving out the years 1881 and 1900, thus giving a record for eighteen years, from 1882 to 1899, both years inclusive.

Owing to limited space, it is not practicable to remark fully upon these tables, and we shall, therefore, simply make a few statements, principally bearing upon hygiene.

In comparing climates many people are inclined to be satisfied with a mere knowledge of the mean temperature, extremes of temperature, and, perhaps, the precipitation at a place; forgetting that several places may have an equality of temperature in every respect, etc., yet, owing to other important meteorological factors, differ widely as to climate.

The higher temperatures are shown to have risen above 90° each year, rising as high as 104°, August 8, 1898; this might lead one unacquainted with the climate of Spokane to suppose that prostration from heat, sunstroke, occurs at this place, but such is not the case; on the contrary, little inconvenience seems to accompany temperatures in this place that in other places induce prostration from heat, sunstroke is entirely unknown here, save by name.

There are two climatic factors worthy of particular attention with regard to Spokane, viz, the mean daily change of temperature, and the sensible temperature. The mean daily